DPP-2 Maths-4 Unit-4

Topic- Random Variables

Q-1- Let X denote the number of heads when a pair of coin is tossed? What is expected value?

Sol- $S = \{HH, HT, TH, TT\}$

X = Number of Heads

$X(HH) = 2$

$X(HT, TH) = 1$

$X(TT) = 0$

Probabilities $\Rightarrow P(X=0) = \frac{1}{4}$

$P(X=1) = \frac{2}{4}$

$P(X=2) = \frac{1}{4}$

Probability Distribution

X	0	1	2
P(X)	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$

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$$E(X) = \bar{x} = 0 \times \frac{1}{4} + 1 \times \frac{2}{4} + 2 \times \frac{1}{4}$$

$$\boxed{E(X) = 1}$$

Q-2: Two dice are thrown simultaneously. If X denote the number of sixes. Find the expectation of X

S = {(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), (2,2), (2,3), (2,4), (2,5), (2,6), (3,1), (3,2), (3,3), (3,4), (3,5), (3,6), (4,1), (4,2), (4,3), (4,4), (4,5), (4,6), (5,1), (5,2), (5,3), (5,4), (5,5), (5,6), (6,1), (6,2), (6,3), (6,4), (6,5), (6,6)}.

Total cases = 36

X = No. of sixes

Probabilities ⇒ $P(X=0) = \frac{25}{36}$

$P(X=1) = \frac{10}{36}$

$P(X=2) = \frac{1}{36}$

Probability Distribution

X	0	1	2
P(X)	$\frac{25}{36}$	$\frac{10}{36}$	$\frac{1}{36}$

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Expectation $(E(x)) = 0 \times \frac{25}{36} + 1 \times \frac{10}{36} + 2 \times \frac{1}{36}$

$= \frac{10}{36} + \frac{2}{36}$

$= \frac{12}{36}$

$$E(x) = \frac{1}{3}$$

Ans

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